

CLAIMS

What is claimed is:

1. A method of producing an olfactory GPCR, comprising:
introducing an expression cassette comprising a promoter operably linked to a nucleic acid encoding said olfactory GPCR into a macroglial cell in vitro, and
maintaining said cell under conditions suitable for production of said olfactory GPCR, to produce said olfactory GPCR.
2. The method of claim 1, wherein said macroglial cell is a myelin-producing cell.
3. The method of claim 1, wherein said macroglial cell is a Schwann, oligodendritic or olfactory ensheathing cell.
4. The method of claim 3, wherein said macroglial cell is a primary Schwann cell.
5. The method of claim 1, wherein said cell is an immortalized macroglial cell.
6. The method of claim 1, wherein said olfactory GPCR is detectable at the cell surface.
7. A method of screening for an olfactory modulator, comprising:
producing an olfactory GPCR in a macroglial cell according to the method of claim 1, wherein said olfactory GPCR is coupled to a G protein;
contacting said cell with a candidate agent; and
assessing the effect of said candidate agent on an activity of said olfactory GPCR, wherein a candidate agent that modulates an activity of said olfactory GPCR is an olfactory modulator.
8. A method of screening for a modulator of an olfactory GPCR, comprising:
producing said olfactory GPCR in a macroglial cell according to the method of claim 1, wherein said olfactory GPCR is coupled to a G protein;

contacting said cell with a candidate agent; and
assessing the effect of said candidate agent on an activity of said olfactory GPCR,
wherein a candidate agent that modulates an activity of said olfactory GPCR is a
modulator of said olfactory GPCR.

9. The method of claim 7 or claim 8, wherein said agent is a small organic molecule.
10. The method of claim 7 or claim 8, wherein said agent is an odorant.
11. The method of claim 7 or claim 8, wherein said contacting is carried out in the presence of a known agonist of the olfactory GPCR.
12. The method of claim 7 or claim 8, wherein said modulator is selected from the group consisting of agonist, partial agonist, inverse agonist, and antagonist.
13. The method of claim 7 or claim 8, wherein said assessing is through the measurement of the level of GTP γ S binding.
14. The method of claim 7 or claim 8, wherein said assessing is through the measurement of the level of a second messenger selected from the group of cyclic AMP (cAMP), cyclic GMP (cGMP), inositol 1,4,5-triphosphate (IP3), diacylglycerol (DAG), and Ca²⁺.
15. The method of claim 14, wherein said second messenger is cAMP.
16. A method of screening for a ligand of an olfactory GPCR, comprising:
producing said olfactory GPCR in a macroglial cell according to the method of claim 1;
contacting said olfactory GPCR with a candidate agent; and
assessing the binding of said candidate agent to said olfactory GPCR.

17. The method of claim 16, wherein said candidate agent is labeled.
18. A method of screening for a ligand of an olfactory GPCR, comprising:
 - producing said olfactory GPCR in a macroglial cell according to the method of claim 1;
 - contacting said olfactory GPCR with a candidate agent in the presence of a labeled known ligand of the olfactory GPCR; and
 - assessing the binding of said labeled known ligand of the olfactory GPCR;wherein a decrease in binding of said labeled known ligand in the presence of said candidate agent is indicative of the candidate agent being a ligand of the olfactory GPCR.
19. A method of screening for an olfactory modulator, comprising:
 - producing a plurality of different olfactory GPCRs according to the method of claim 1, wherein each of said olfactory GPCRs is coupled to a G protein;
 - identifying a set of different olfactory GPCRs that are activated by a first agent, wherein said first agent is a known olfactory modulator;
 - contacting said set of GPCRs with a second agent; and
 - assessing an effect of said second agent on an activity of said olfactory GPCRs,wherein a second agent that modulates one or more GPCRs of said set of different GPCRs modulated by the first agent is an olfactory modulator.
20. The method of claim 19, wherein said set comprises three or more GPCRs.
21. A macroglial cell comprising a recombinant nucleic acid encoding an olfactory GPCR.
22. A kit comprising:
 - a macroglial cell; and
 - a nucleic acid encoding an olfactory GPCR.

23. The kit of claim 22, further comprising instructions for producing said olfactory GPCR using said macroglial cell.
24. A method of identifying an odorant of interest in a sample, comprising:
contacting a sample with a plurality of macroglial cells producing a plurality of different olfactory GPCRs according to the method of claim 1, wherein each of said olfactory GPCRs is coupled to a G protein; and
assessing activation of said olfactory GPCRs for the presence of said odorant;
wherein activation of a pre-determined set of olfactory GPCRs indicates the presence of said odorant in said sample.
25. A method of determining a "fingerprint" of an odorant, comprising:
contacting a sample with a plurality of macroglial cells producing a plurality of different olfactory GPCRs according to the method of claim 1, wherein each of said olfactory GPCRs is coupled to a G protein; and
assessing activation of said olfactory GPCRs for activation by said odorant;
wherein said "fingerprint" comprises the set of different olfactory GPCRs activated by the odorant.
26. The method of claim 25, wherein said contacting is carried out in the presence of a known agonist of one or more of the plurality of olfactory GPCRs.
27. The method of any one of claims 24 to 26, wherein said plurality of cells is an addressable array of cells, wherein each address of said array contains macroglial cells producing a single recombinant olfactory GPCR.
28. The method of claim 27, wherein said GPCR activation is assessed using a light-emitting reporter of GPCR activation.